DOCUMENT RESUME

ED 301 183 IR 013 523

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TITLE Microcomputers: Developing Teacher Confidence and Management Skills.
PUB DATE 6 Apr 88
NOTE 8p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 5-9, 1988).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Environment; *Classroom Techniques; *Cognitive Style; *Computer Literacy; Higher Education; *Inservice Teacher Education; Instructional Program Divisions; Microcomputers; *Preservice Teacher Education; *Teacher Attitudes

ABSTRACT

This report explores teacher computer education through a comparison of two investigations of computer confidence in teachers: (1) taped interviews with preservice teachers and observations of their attitudes and teaching behaviors as they presented classroom and computer activities as student teachers; and (2) an overview of the development of a successful computer education program in a large urban school district, which reinforced the findings of the first study with practical applications at the teacher inservice level. The preservice teachers were also tested with several cognitive and learning style instruments to increase their understanding of their teaching/learning style. The first study found that computer use in the classroom was related to teachers' knowledge of basic computer operation, computer support, computer availability, classroom management skills, and personal commitment. Grade level and classroom structure (formal versus informal) were not factors in the successful implementation of computer activities. Both computer education studies showed the necessity of presenting computer activities in a manner that is meaningful to the teacher to prevent the anxiety or stress that new technologies may produce. (EW)

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ED301183

Microcomputers: Developing Teacher Confidence and Management Skills

A paper presented to The American Educational Research Association
in New Orleans, Louisiana, April 6, 1988
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Abstract:

This paper explores teacher computer education through a comparison of two investigations concerning computer confidence in teachers. (1) The researcher's thesis provided data through observation and interview about teacher development of computer knowledge and its application with students in the classroom at the pre-service level. (2) An overview of the development of a successful computer education program in a large urban school district reinforced the findings of the first study with practical applications at the teacher inservice level. The study found that computer use in the classroom was related to knowledge of basic computer operation, computer support, computer availability, classroom management skills, and teacher commitment. Grade level and classroom structure (formal vs. informal) were not factors in successful implementation of computer activities. Both computer education programs show the necessity of presenting computer experiences in a manner which is meaningful to the teacher to prevent the anxiousness or stress that new technologies may produce.

Thesis Study:

The eighteen month study was conducted at Ohio State University between 1985-87 school year. There were seven participants who were enrolled in a teacher education program (Writing Across The Curriculum Area, WACA) that stressed the application of learning styles and metacognitive strategies in combination with computer experiences. The study began with a taped interview autumn quarter of their senior year. The last recorded interview was conducted the January following their graduation in 1986. During the participants senior year, the researcher observed and recorded attitudes and teaching behaviors of the preservice teachers as they selected and presented classroom and computer activities while serving as their field and student teaching supervisor.

The WACA computer education program began spring quarter before their senior year. During this quarter, they were introduced to basic computer operation, word processing programs such as Apple Works (Claris) and Bank Street Writer, and other computer capabilities such as electronic mail. During autumn quarter, the participants refined their computer skills while learning Appleworks word processing, data base, and spreadsheet; and sending electronic mail. They previewed some drill and practice programs also. During their methods courses, they were encouraged to use the computer across the curriculum but only had a few specific assignments. None of the participants had used the Apple Computer or were aware of the educational software available before their WACA experience. One of the students had had one course in Basic using an IBM.

The participants were given the Myers-Briggs Type Indicator (Myers & McCaulley, 1985), Letteri's Cognitive Profile Test Battery (Letteri, 1979), and the Learning Style Profile (Keefe, Monk, Letteri, Languis & Dunn, 1986). These instruments were used as reflective tools for the participant to increase their understanding of their teaching/learning style. The instruments also provided the researcher with data concerning the participants teaching/learning style.

Using Glickman's Supervisory Behavior Continuum (Glickman, 1985), the

IR013523

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participants were classified as Non-directive, Collaborative, and Directive Control based on the researcher's supervision style with each participant. Comparisons were made between the participants computer confidence, frequency of computer use in the classroom, MBTI, Letteri Profile and Glickman's supervision pattern. The chart is below.

Comparison of Learning Style, Previous Computer Experiences, Computer Confidence, Classroom Computer Activities, Grade Levels and Supervision

	Sue	Annie	Beth	Terri	Cindy	Joan	Jane
MBTI	ISFJ	ISFJ	ESFJ	ENTJ	ISFJ	ISFP	ISFJ
Letteri Type	II	II	I	II	II	II	I
Computer Exp. before WACA	Some	None	None	Courses	None	None	Some
Computer Attitudes							
Autumn:	C	C	C	OK	C	OK	UE
Spring:	C	C	C	C	C	C	C
Computer Activities							
Integrated A:	Freq	Freq	Freq	Freq	ST	ST	Freq
Drill:	Freq	Freq	ST	Never	ST	ST	Freq
Grade Levels	3rd	2nd	4th	DH Jr.H	K 2nd K	SBH 1-2 K	1st 3-4
Supervision	Non-D	Non-D	Coll	Non-D	Direct	Coll	Non-D

C - confident
OK - OK
UE - uneasy

Freq - frequent
ST - sometime
Never - never

Non-D - non-directive
Coll - collaborative
Direct - direct

The chart indicates that all participants were comfortable with the computer activities by the spring following their field experiences. There were three of the four ISFJ Types who used integrated and drill activities "frequently" while the only ISFP Type used integrated and drill activities "sometimes." The only ESFJ Type used integrated activities "frequently" and used drill "sometimes."

When a comparison of supervision classifications were considered the data indicates that the teachers management skills may have had an influence on the use of the computer in the classroom. The one ISFJ who integrated the computer "sometimes" taught Kindergarten and second grade with the same computer integration. This participant was classified as Directive Control which would indicate growth was needed in the area of classroom management.

Of the two participants who were classified as Collaborative, one used integrated and drill activities "sometimes". This participant was the only ISFP Type in the study. However, those computer activities that were used by this participant were of a creative nature using Koala Pad (Koala Technologies), Delta Draw, and Print Shop (Broderbund Software).

The other participant classified as Collaborative integrated the computer frequently at fourth grade level. This participant was the only ESFJ Type in the study. The participant's case study indicates this participant questioned the value of the computer in the classroom in relationship to the planning time for its integration and its disruptive nature in the classroom. Her journals also reflected her concern to develop more satisfying classroom management techniques. This participant graduated in education but chose to go into business but still maintained an interest in computers.

The only ENTJ Type in the study was classified as Non-directive in both elementary and Junior High. This participant used electronic mail to encourage science questions between an OSU professor and the SBH class and to establish pen pals between sixth grade students and the junior high class. This participant's journals and conferences were very reflective of the teaching/learning process.

The study found that computer use in the classroom was related to knowledge of basic computer operation, computer support, computer availability, classroom management skills, and teacher commitment. Grade level and classroom structure (formal vs. informal) were not factors in successful implementation of computer activities. The following section summarizes the study's findings.

a. The knowledge of the basic operation of the computer was necessary. This knowledge helped the participants identify problems with the computer more quickly and with less frustration. They found the use of simple written directions of computer procedures aided in remembering frequently used commands without stress.

b. The participants expressed the need to actually do the computer activity before they felt comfortable or knowledgeable about the activity. Therefore, hands-on computer experience was necessary.

c. The participants felt it was more valuable to learn a few programs which could be implemented in a variety of ways throughout the curriculum based on the needs of their students rather than to be overloaded with many programs.

d. However, the participants were curious and felt the need to become aware of the types of computer software available. They wanted to provide drill and practice activities that met their students' needs but felt time restraints for evaluating software.

e. All of the pre-service teachers suggested that the development of classroom management skills were necessary for successful use of the computer. Classroom management skills included their teaching style and their implementation procedures for computer activities in the classroom. Although the sample is too small to formulate any conclusions about Type based on Myers-Briggs Type Indicator and computer implementation, the data does suggest that the skills needed for development of strong classroom management may be related to type characteristics.

f. The data indicate that factors other than grade level and classroom structure affect the integration of the computer in the classroom. The pre-service participants were successful in implementing computer activities in grades 1, 2, 3, 4 in both traditional and informal classroom structures. Although the two participants in Kindergarten had the fewest computer activities in the study, one of pre-service participants went from a fourth grade to kindergarten and was responsible for successfully developing computer centers in her kindergarten classroom as a first year teacher. This participant even had to go scrounge discarded computers from the high school. Although she had not used this brand of computer before, she had confidence she could figure it out! And she did!

g. The support system of the other WACA Students was valuable for stimulating new computer activities during student teaching and for continued computer growth in their own classrooms.

From Research Into Practice:

The results of the study are illustrated in practice by the computer development in Columbus Public Schools. The challenge of a large school district to support the needs of teacher computer education as the technology evolves from its infancy into an all encompassing teacher tool, student tool and curriculum requirement has taken insight and continual planning and reevaluation of computer needs. Like the WACA participants, the school districts teachers lacked computer literacy in the early years of computer education because it was a new technology. Now the system is faced with the continuing education of teachers with a variety of computer experiences. However, a review of the development of computer education in Columbus suggests an awareness of the development of teacher education programs which support those needs expressed in the study.

History of Computer Growth in Columbus Public Schools

CPS is a large urban school district of over 60,000 students, 4,000 teachers and 132 school buildings (16 High School, 26 Middle, 88 Elementary, 4 Vocational, and 1 Adult Education Center). Although some buildings had bought computers with PTA monies before 1982, the district began computer education officially during the 1982-83 school year in three high schools. The program was expanded during the 1983-84 school year with 15 Apple II e's in each of the 16 high school. During the 1984-85 school year, each middle school received 15 Apple II e's and each intermediate elementary building received 10 Apple II e's. Each primary elementary building received 10 Apple II's in 1985-86 school year. All buildings now have at least three printers and 15 computers. CPS is in the process of placing one computer in each K-6 elementary classroom within the next three years.

A Computer Supervisor was hired in 1983 to develop a computer instructional support system for the district. By the 1987-88 school year, this support system includes a computer specialist for the high school and middle school levels and three computer specialists at the elementary level.

Inservice Workshops

When CPS began computer education in 1982-83 computer technology for schools and homes was still in its infancy. The district began computer education at the high school level because of the need to educate these young persons quickly for their future. During the summer of 1983, CPS joined with Ohio State University and community leaders to establish the first Summer Tech Program. This venture received an overwhelming response from the community and teachers that first summer.

For the establishment of the first Summer Tech, all the computers in the district were transported to a central location for computer instruction during four weeks in July and August. There were over 80 courses offered which appealed to individuals of all ages. The program was open to anyone in the community interested in computer literacy at a nominal cost. While some of the courses were designed specifically for teachers, others were designed to develop the use of specific programs or individual computer needs. Summer Tech has continued each summer since 1983. However, some courses are now offered in school labs around the district. Summer Tech now provides an organization by which the district continues to provide inservice education for teachers during the summer as well as computer enrichment for students, parents and the community. Summer Tech provides the learner with a choice of hands-on computer experiences and course work. Many of the suburban districts pay tuition for their teachers to attend Summer Tech.

CPS is taking advantage of individual interests and experiences through after-school workshops. These workshops are presented in school computer labs throughout the district by the five computer specialists. The workshops are an hour and half in length and present specific programs or curriculum activities with hands-on experiences. These workshops reflect basic and advanced computer education. While one workshop will provide an introduction to Appleworks' database which is available to all teachers in the district; another workshop will offer individual help in refining a personal database file. Other workshops review computer activities that can be integrated into specific areas of the curriculum. These workshops are tailored to the needs of the participant by the specific offerings and voluntary participation. For the 1987-88 school year, the district will offer over 50 After School Workshops with an average of ten teachers attending each session. These workshops are offered at different times throughout the district. A staff may also request a specific workshop to fit the needs of their building or staff experiences. These workshops provide written material about the computer material covered in the workshop which the participants in the study stated was important for continued computer growth.

Teacher Support

The participants in the study suggested the support of their WACA classmates was important in their computer growth both during their experience year and their first year of teaching. CPS provides Computer Specialists which are available to individual teachers or schools' staff to field questions, to provide activity ideas or to assist with specific management problems. The Computer Specialists provide other opportunities for sharing. At workshops, they provide time for sharing computer activities and procedures. They also publish a monthly newsletter with current information about computers and stimulating computer ideas from teachers in the district.

The decision by CPS to establish hardware and software support for mostly the Apple Computer in the district has made it possible to establish one of the largest Apple Software libraries in the nation. The computer programs which support the course of study or staff software tools are purchased for each building or a sight licence is secured.

Other titles may be borrowed from the library which can be sent through the school mail. This support enables the district to provide workshops needed to support common programs or software tools. It also provides the staff with common experiences so that the sharing of instructional ideas using common software and hardware is relevant to the largest number of teachers.

Software Evaluation

The WACA participants expressed a need to explore and know software available in order to provide for the individual differences of their students. However, they felt the pressure of time to review and categorize programs. CPS is making this easier for the classroom teacher through the development of evaluation teams comprised of teachers who are involved in evaluating software using a standard form which has been developed and refined (handout). Part of the software evaluation process is a consideration of the course objective. Is the computer the best instructional tool to meet the objective? (See evaluation handout)

Software for Math and Science has been evaluated and matched according to the course of study objectives. Computer activities have been written in science based on the district's textbook using software available in all of the schools (Game Frame, Houghton Mifflin Company). An evaluation of reading, language arts, and social studies computer activities is the next step.

Another innovative idea is self-sticking labels which have been printed and distributed to each teacher at the middle school and elementary level by the Math Department. These labels consist of the course of study objective, manipulatives available, and computer software, matched to the math textbook page (handout sample). These labels are placed in the teachers' manual on the appropriate page. The labels allow the teacher to select software quickly that will meet the individual needs of students for a specific course objective.

Classroom Computer Teacher

Will all classroom teachers become computer teachers? Will each of the computers being provided in the classrooms for teachers be used as a teaching tool? The researcher's observations of the seven pre-service teachers suggests that two factors other than computer knowledge and computer availability are necessary for teachers to begin to use the computer as a tool. Those factors are classroom management and teacher commitment.

Almost all of the CPS workshop formats and computer experiences are built on voluntary participation from the staff. Kathleen Goss, a Columbus Computer Specialist, readily admits that many of the same teachers attend the variety of workshops offered by the district. However, each year there are more staff members who are taking advantage of the workshops offered. As computers become available to the teachers in the classroom, the study would suggest that the focus of integrating the computer and computer activities in the classroom may need to be based on the development of teacher management skills. The MBTI suggests that some personality types may support those management skills necessary for successful computer implementation while other types may need more support in this area to be successful. Perhaps the teachers who first used the computer in the classroom developed those management skills on their own.

The MBTI characteristics also suggests that different people enjoy different types of approaches to subject matter. The WACA's only F-P Type used more computer activities that involved creative projects such as 'drawing castles and measuring the lines'

in second grade as part of a castle unit than a 'drill and practice program'. The development of workshops which will tap the creative resources of teachers may enhance computer use by some teachers.

Summary

The results of the WACA Study and the experiences of CPS supports the need for teacher computer in-service education to be a relevant hands-on experience for the teacher. Materials at the workshops need to support the computer skills or activities being learned. However, a computer in every classroom and access to computer knowledge will not insure that every teacher will be willing to learn to use the computer as a teaching tool. A variety of workshops or personal contacts by consultants or teacher support teams dealing with the integration and management of the computer and computer activities may be necessary. The development of workshops that explore creative uses of the computer and its integration into the curriculum may stimulate interest where there was none before.

Teachers need to see the integration of the computer in terms of their own teaching values and interests. They need to be shown or to understand the relevance of the activities towards meeting their teaching objectives before they will be willing to take their precious time and energy to master this new technology.

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